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DISCUSSION OF SURVEY METHODS

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In most jobs surveys are necessary to determine where and how much insect activity or loss is going on. To a considerable extent, methods are dependent on the objectives, the degree of accuracy desired and the type of insect. Though other insects are concerned in the work at this laboratory, I believe this discussion ought to be confined to methods for surveying and assessing barkbeetle infestations as that is where the major portion of our effort must be expended.

RESOURCES

The methods to be used are dependent on the objectives and the financial resources. Resources at this station are not sufficient to provide for an ideal system on a region wide basis, though proposals for such a system were presented to Washington two seasons ago. Thus the financial resources enter into all general plans and can be ignored only in small local or special jobs. They have to temper all our other action.

OBJECTIVES

Objectives are dependent chiefly on the requirements of use of the data. The objectives can be segregated as those to meet service and those to meet research requirements. The requirements of the one form are not necessarily enough like those of the other to make the methods to meet one type of objective satisfactory for the other. However, it seems desirable to build permanent survey systems in some sort of a compromise form that will serve both types of work.

Peactically all the survey methods and plot systems in this region have been developed primarily from the service standpoint. Whereas the primary objective of a few years ago was to supply data for direct control recommendations, in commercial forest areas at least, other objectives seem to have assumed a greater importance today.

USES

The uses to which the survey data may be put are as follows:

A. DETECTION OF OUTBREAKS

This use requires coverage of all timber types of areas of any importance by some survey method. No measurements seem to be needed for this purpose. Its effectiveness is dependent almost entirely on understanding observation and critical interpretation. However, quantitative data helps and under most conditions a yardstick type of sampling should be satisfactory.

B. CONTROL RECOMMENDATIONS

This use requires a sufficiently detailed coverage and sufficiently accurate measurement of loss to enable the selection of areas and parts of areas, to determine the character of the infestation and to estimate the amount of work to be done and money to be expended with a reasonable degree of accuracy. For most areas a yardstick type of sampling has been adequate, but occasionally it has resulted in unsatisfactory estimates. Inasmuch as appropriations and labor are concerned sampling methods of considerable accuracy seem desirable.

C. MANAGEMENT RECOMMENDATIONS

These are essentially control recommendations written into management plans for use over a relatively long period of time. They deal chiefly with recognition of situations in green timber leading to chronic or heavy losses and require a segregation of areas. Thus survey methods must recognize the areas of high and low hazard on sale areas; must recognize dangerous situations in advance of their occurrence; must furnish sufficiently accurate estimates based on good sampling to meet legal requirements of contract clauses.

On one sale, control has been required when over 2% of the stand is killed in a given year. That clause requires sampling sufficient to determine accurately when 2% is killed, but better yet should be able to determine early in the season if the 2% limit is likely to be approached.

On other areas, control starts at 400 b.m. loss per year per acre. The same accuracy as given above is required and the same advance notice of probable loss is desirable.

In other sales, areas of high hazard must be recognized as the basis for moving logging operations to salvage values on those areas. In most cases it is a matter of picking the highest hazards for first cutting. Actually a forecast of infestation conditions for several years ahead is necessary. The mechanics for such forecasts certainly are not yet available to supply data of a known or a given degree of accuracy.

Surveys to meet management use requirements thus may be of any type, though certain uses require certain types of accuracy. In some cases yardstick sampling is sufficient, in others sampling yielding results of known accuracy are necessary.

MISCELLANEOUS USES

A. EXPERT EVIDENCE IN LAND EXCHANGES

This requires a knowledge of infestation history and possibility of future losses. Keen observations might work, yardstick plots

would provide a basis for recommendations if the areas are large enough. The type of coverage and methods of survey used by the Hazard Inventory would be adequate and satisfactory and if the Hazard Ratings of the present inventory continue to wkr out and are valid over a long period of time that work could be used.

B. EXPERT EVIDENCE IN TAX DISPUTES

This type of work will probably enter more and more into the survey picture and we shall be called upon as experts to render our opinion. That opinion must be bolstered by the best information available which should yield a desired accuracy on small areas by individual years.

RESEARCH OBJECTIVES

In much of the research work, methods, plots and details of data must be made to fit the particular job. In some of the broader studies such as those dealing with silvical and climatic factors in relation to loss and to studies of the effects of infestations on stands and values, survey plots can be used. The factor of accuracy of area loss estimates based on the sample do not seem to me to enter into the proposition. The chief thing is that extra detail is needed to meet the research requirements that may not be needed to meet the service requirements.

DISCUSSION

The enumeration of uses and requirements given above can help in formulating statements concerning objectives and methods of a general survey system. The objectives of the work at this station seem to me to be the following.

1. The furnishing of adequate information concerning losses and possibilities of loss for large and small areas when and where such information is required.

2. The collection of long term loss records in a detailed enough form and in satisfactory shape for analysis for the study of some of the broader research problems in which data from scattered plots are necessary.

Are our present surveys reaching these objectives? If not, what can be done?

Obviously our coverage of timbered areas in the State is far from adequate: The following are a few comments I would like to make.

1. It seems to me that coverage of all timbered areas with sufficient intensity to secure accurate estimates, especially for small units for which those estimates may be necessary, is a physical impossibility with the financial and personnel resources we have or are likely to get:

2. However, coverage must be extended beyond limits of areas now being sampled

3. Establishment of extra plots and sampling systems should be made primarily to meet service requirements.

4. The plot systems should be adapted as needed and only in part, to meet research requirements.

5. In continuing the general surveys the type of data to be taken should be agreed upon and its form fixed. Standardization of methods is desirable. Stand data should be available for each plot. Plot boundaries must be well established. What constitutes the satisfactory condition of plot information still has to be decided upon. Definite statements of procedure must be drawn up and made available as regulations for survey work to supplement those already in effect.

6. In my opinion, 320 acre plots are too large to handle in enough detail and 20 acres too small to be handled practicably. However, that is an opinion that may or may not be established by field application.

7. More intelligent selection of plot locations so as to secure weighted samples of type and hazard should be the rule rather than the exception.

8. Cutover lands must come more and more into the survey picture.

9. No one method of sampling or survey will adequately fit all needs unless the work be done in extreme detail. Extreme detail is not possible. Therefore survey methods should be planned for specific areas to fit such future requirements as can be foreseen. Survey plans must be drawn up with an eye to future developments.

10. Methods applied to any given area should be subject to modification as required. New objectives and uses not yet apparent must be recognized, and new methods developed to meet their requirements.

11. It seems to me that the three main objectives of service effort should be as follows in the future:

A. Extension of service.
B. Anticipation of requirements.
C. Adaptation of systems and methods to new or changed requirements as they occur.

12. It seems to me that the four main objectives of research effort on survey plots should be as follows in the future:

A. Continued study and improvement of present field methods, including studies of plot location, lot size, area sampling and field tests.

B. Careful planning of general survey plot records to make them satisfactory for analysis to yield desired results.

C. Special preparation and use of key survey plots and gathering of detailed records on them for use in broad silvical, climatic, or tree selection studies.

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